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ABSTRACT

A study examined whether retention of sight vocabulary words could be increased by implementing the tactile modality to a visual, auditory, and kinesthetic based lesson. A total of 10 first-grade remedial reading students in Elizabeth, New Jersey, were assigned to control and experimental groups, with 5 students in each group. Upon completion of 7 weeks of learning a total of 30 sight vocabulary words, the students were tested for word retention. Results indicated that analysis of the data showed a minor difference between the number of words retained in the experimental group compared with the control group. Findings suggest, however, that the difference was not statistically significant. (Contains a table of data, related research, and 20 references.) (Author/CR)

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ED 405 550

The Effect of the Tactile Modality on Retention of Sight Vocabulary

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ABSTRACT

This study was conducted to determine if retention of sight vocabulary words could be increased by implementing the tactile modality to a visual, auditory, and kinesthetic based lesson. A total of ten first grade remedial reading students were assigned to control and experimental groups. Five students were in each group. Upon completion of seven weeks of learning a total of thirty sight vocabulary words the students were tested for word retention. Analysis of the data indicated that there was a minor difference between the number of words retained in the experimental group compared with the control group.

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Table I - Means, Standard Deviations and t of the Samples' Pre-Experiment Scores 7

During the first few years of reading instruction it is important for students to build a large sight vocabulary, words that are recognized without the use of decoding skills. However, for some students this goal is not reached at the same pace as their grade level peers. According to Miccinati (1979) "More often than not a child who is not learning to read by conventional methods does not have a strongly identified mode of learning. A multimodal approach, therefore, allows the child to develop strength in a particular area or combined area."

"Most early studies restricted their examination of modalities to the auditory or visual, neither of which tends to be the strength of young children, who are more likely to learn tactually (through manipulatives and a hands-on approach) or kinesthetically (through a whole body, activity oriented experience)." (Dunn 1988)

Studies that only focused on the subjects modality preference often indicated no correlation between teaching through the subjects learning modality preference and increased success. The results of an experiment

by Ringler and Smith (1973) revealed no significant difference between those subjects who were taught through their modality preference and those subjects who were taught by a method that did not correspond to their modality preference. Vandever and Neville (1974) concluded that " At the end of six weeks of instruction, analysis of covariance revealed that children taught to strength did no better than those taught to weakness." However, it only seems logical to teach through all of the modalities in order to reach all of the students the best way possible.

Grace Fernald, who developed a multisensory approach in which the distinguishing feature is tracing, observed that children sometimes could not learn through normal reading methods using visual and auditory channels. She believed that the addition of kinesthetic and tactile methods would assist their learning. (Myers 1978)

A study done by R.A. Pulliam (1945) found that the percentage of retention was much greater under a word tracing method than under a non-tracing method. This method involved tracing indented words in

heavy cardboard with finger contact while saying the word. The results of his study indicated that remedial teaching may be considerably facilitated through the use of indented word cards.

Samuel A. Kirk (1933) conducted a study with six subnormal boys ages six to nine to determine the influence of manual tracing on the learning of simple words. His study compared manual tracing to the conventional "sight" method. There was no conclusive evidence in terms of trials to learn. However, the results indicated that every subject retained a greater number of words when the manual tracing method was used, although the differences were not significant for most of the subjects.

The studies by Pulliam (1945) and Kirk (1933) both indicate a positive correlation between the tactile modality and retention of new vocabulary words.

Muscle memory is much more efficient for long term memory than visual or auditory. Riding a bike, driving a car, or typing are all good

examples of kinesthetic and tactile activities. If these activities were not experienced for a period of time it is unlikely they would be forgotten.

Most educators limit their instruction to the visual, auditory and kinesthetic modalities often leaving out the tactile modality. This is sufficient to facilitate learning and retention for the majority of the students, however, even if only a small majority benefit from the added tactile modality it would prove beneficial.

HYPOTHESIS

To provide additional evidence on this topic, the following study was undertaken.

It was hypothesized that there would be no significant difference in the retention of sight vocabulary words of remedial first grade students who learn through visual, auditory, and kinesthetic modalities when compared with those who learn through visual, auditory, kinesthetic, and tactile modalities.

PROCEDURES

The total sample for this study consisted of ten remedial first grade students enrolled in an urban school system located in the town of Elizabeth, New Jersey.

Two samples of remedial reading students were identified as experimental and control samples. Each sample consisted of five students. The control sample was taught sight vocabulary words through the visual, auditory, and kinesthetic modalities. The experimental sample was taught sight vocabulary words through the visual, auditory, kinesthetic, and tactile modalities. The sight vocabulary words were taken from their Macmillan basal stories.

Each new word was written on the board by the teacher, read to the students, and copied on paper by the students. Every student orally used the new word in a sentence. After five words were introduced the students took turns reading four or five sentences containing the new words. The experimental sample traced the words in sand twice with the

forefinger of their dominant hand. For the initial tracing they were required to look at the word written on the board. During the second tracing looking at the word was optional. However, during the second tracing, the students were encouraged to do it independently from memory. Spelling was checked by the teacher and corrections were made by the students.

The students were tested individually in a secure area the following day. Flashcards were used as the testing device.

Upon completion of seven weeks of learning new sight vocabulary words, the students were tested individually with flash cards containing the sight vocabulary words.

t tests were used to determine the significance of mean differences, if any, between the samples.

RESULTS

The subjects were tested to determine the number of words retained the day after each new sight vocabulary word list was taught and upon

the completion of seven weeks of learning the thirty new sight vocabulary words. This data is listed in the appendix.

A t test was used to determine the significant difference between the experimental sample and the control sample. The experimental sample was taught sight vocabulary words through the visual, auditory, kinesthetic, and tactile modalities. The control sample was taught sight vocabulary words through the visual, auditory, and kinesthetic modalities. The results of this test are presented in Table I. As can be seen in Table I, there was a minor difference between the means of the

Table I

Means, Standard Deviations and t of the Samples' Pre-Experiment Scores

Sample	Mean	Standard Deviation	t
Experimental	22.80	5.49	1.04
Control	18.80	6.61	

samples' achievement at the onset of the study and this difference was statistically not significant.

Conclusions and Implications

The findings revealed no significant difference in the retention of sight vocabulary words of first grade students who learned through visual, auditory, and kinesthetic modalities when compared with those who learned through visual, auditory, kinesthetic, and tactile modalities. It is possible the results were affected by conditions outside the control of the investigation.

First, the students had varying degrees of exposure to stories containing the new words over the seven week period. The amount of time each student spent reading stories containing the words at home could not be controlled. In addition, a higher rate of absenteeism among the experimental group may have affected the results.

Related Research

There are different senses in which we take in information to learn. These senses are sight, sound, taste, touch, and smell. Whether one is more important to learning depends on what is being learned and how well the sense being used functions. As educators, it is important for us to take into account the individual differences of our students. To achieve this it makes sense to teach by implementing a multimodality approach within our lessons. This would enable educators to meet the needs of more students. Most educators use visual, auditory, and kinesthetic aids within a typical reading lesson excluding the tactile modality.

There has been very little research on the importance the tactile modality may have on the retention of written words. Of the research done, some of the researchers have found success, while others believe tracing does not improve retention significantly, if at all. The research that is presented will demonstrate case studies and learning situations in which tracing proved to be useful to some, and not useful for others.

Although Kirk (1933) proceeded Dr. Grace Fernald (1943) with originating the VAKT (visual, auditory, kinesthetic, tactile) approach, Dr. Fernald is often credited in this area. This multisensory approach involves seeing the word, saying it, tracing it with the middle and index finger, and finally writing it. This process is repeated until the word can be written without looking at the word. Fernald's method stresses whole-word learning and there is no attempt to teach phonics. She believes tracing brings sequential order to learning. In addition, tracing may help the child recognize the constant features of letters and words, which is essential in learning to read. As learning progresses confusion of symbols, inversions, and reversals usually disappear.

Fernald's technique was developed to aid children who could not learn through normal visual/auditory reading methods. She believed that the addition of the kinesthetic and tactile modalities would assist their learning. Many researchers and educators believe her approach to be beneficial to disabled readers while others have found no significant

improvement when the kinesthetic and tactile modalities are added to assist learning. Myers (1978)

Jeanette Miccinati (1979) researched the Fernald Technique and variations of the technique all of which include the tracing modality in various forms. According to Miccinati, success of the Fernald Technique requires the instructor to be thoroughly informed with the method, possible variations, and reinforcement techniques. In addition it is important for the instructor to correctly analyze the child's individual idiosyncrasies.

Gillingham and Stillman, (1970), are also known for their work with the VAKT method. However, unlike Fernald's whole-word approach the Gillingham method features sound blending. Each letter sound, not the whole word, is taught with a multisensory approach. An associative process is used in which the student links the name and sound of a letter with its printed symbol. The Gillingham method involves the following procedure:

1. One letter on a drill card is shown to the student as the teacher says the letter name. The letter name is then repeated by the student. The teacher then says the letter's sound, and the student repeats the sound.
2. Without using a drill card the teacher makes the sound represented by the letter and the student must name the letter.
3. The teacher writes the letter and explains its form. The student must then trace over the letter, copy it, and write it from memory. Last, the teacher makes the sound of the letter and the student writes the letter.

The next steps of the Gillingham method require blending phonetic words and drill for nonphonetic words. In addition, syllabication, dictionary skills, and additional spelling rules are utilized.

The Gillingham method has been criticized for its lack of interesting activities, its lack of emphasis on comprehension, and because students

using this method tend to develop a labored reading style. (Mercer and Mercer (1993)

Samuel A. Kirk (1933) compared the results of teaching vocabulary words using the manual tracing method with the conventional "sight" method. His subjects were six boys ages 9-1 to 11-3, who had mental ages of 6-3 to 8-1.

Each word was presented for seven seconds. For the sight method, the subject looked at, heard, and said the word. For the manual tracing method, tracing the word with a dull pencil was added.

No conclusion was reached in terms of the number of needed trials to learn, however, the results showed that every subject retained more words when the manual tracing method was used.

The purpose of a study by R.A.. Pulliam (1945) was to evaluate tracing indented words on a prepared set of cards as a technique of teaching new vocabulary words. Eighteen children were selected for the experimental program. Their grade classifications ranged between the

second and ninth grades and the median I.Q. of the group was 108 with a range of 98 to 116.

The tracing method of instruction and a non-tracing method of instruction were used to teach the vocabulary words to each student. The pupils spent the same amount of time under each method, were taught by the same teacher, and they were taught an equal number of words under each method.

Pulliam concluded from evaluating the results of the tracing method verses the non-tracing method that 1. The indented word card tracing method had a much greater percentage of retention than the non-tracing method. 2. The indented word cards proved to be an excellent tool for use in vocabulary development. 3. This experiment indicates that through the use of indented word cards remedial teaching may be facilitated.

An experiment designed by Roberts and Coleman (1958) tested several assumptions regarding the use of kinesthetic (including tactile)

methods in remedial reading cases. They wanted to see if reading failures are (1) deficient in visual perception, (2) less efficient than normal readers in learning new material when visual cues alone are used, and (3) more efficient in learning new material when kinesthetic elements are added to purely visual cues. Their study found:

(1) On a test of visual perception, normal readers did significantly better than reading failures.

(2) Normal readers learned new material with visual cues only significantly more efficiently than reading failures.

(3) Reading failures were significantly better at learning new materials through methods that included the kinesthetic (including tactile) strategies than those that utilized visual stimuli only.

(4) Normal readers did not gain significantly in learning new material through methods that included the addition of kinesthetic (including tactile) strategies to visual ones.

(5) The addition of kinesthetic (including tactile) to visual cues did not significantly aid reading failure cases who achieved normal scores on the test of visual perception.

(6) Normal readers with lower than average scores on the test of visual perception learned faster when kinesthetic cues (including tactile) were added to visual cues.

Serena Niensted (1968) had success with a Fernald technique by modifying it so that she could use it with a group of troubled junior high school boys. It was used to improve their auditory discrimination, handwriting, spelling, word attack skills (including phonics and syllabication) , and phrasing. The method requires teacher prepared duplicated manuscripts that are large enough for the students to trace the words with their fingers. For the first reading the teacher slowly pronounces the phonemes as the students trace the letters. During the second slow reading, the students underline the syllables as the passage is read. The third reading is read in meaningful phrases as the students

put lines between words when the teacher pauses for breath. The pupils were then required to take turns reading the passage in meaningful phrases.

Loveless and Blau (1982) took a different approach when researching the importance of the tactile modality. In an attempt to stimulate the right hemisphere, which is linked to manual pattern recognition, Loveless-Blau (1980) used a pair of goggles that were totally opaque to give the feeling of not seeing. The examiner then voiced a word and placed three-dimensional letters into the child's left hand, in proper sequence, while naming each letter.

The child echoed each word and manipulated the letters to establish their shape and identity.

After three trials, the child used his left hand in order to put the now scrambled letters into their proper sequence. The examiner took the letters away as they were properly sequenced. The letters were

verbalized and the word was verbalized after the unscrambling process. This was also done three times.

For the next step the child wrote the word with his preferred hand three times while goggled. To conclude the procedure the experimenters activated the visual modality. The child visually examined the pattern of the assembled and written words and wrote the learned word repeatedly, from memory, covering each one to avoid copying.

The same procedure was followed using the child's right hand and produced substantially inferior results in immediate recall but not in delayed recall.

These investigations conclude that tactual stimulation and kinesthetic movement are important ingredients for word mastery, especially for LD students.

Murphy and Mclaughlin (1990) examined the effects of a tactile and kinesthetic teaching method on the spelling performance of a special education student from a regular fourth and fifth grade classroom. The

visual and auditory methods used in the regular classroom spelling instruction were not effective in teaching this student to spell.

There were two separate interventions carried out for this study. For the first intervention, the tracing element was added to the previously used auditory and visual methods. The target words were traced with the index finger of the dominant right hand. The results showed improvement in accuracy in weekly tests, but modest long - term retention. During the second intervention, there was daily` dictation of list words in sentences added to the tactile method. The target words were first traced with the index finger of the dominant right hand and then written from sentences dictated by the examiner. These results indicated accuracy in weekly tests that were greater than those achieved during the first intervention.

The results of this study illustrate the importance of the kinesthetic and tactile modality in helping some students to learn and retain written words.

Vandever and Neville (1972-73) conducted a study with first graders to determine whether or not tracing cues are as effective as visual and auditory cues for good and poor decoders. Twenty first graders that scored above the median on a word knowledge test, and twenty first graders that scored below the median on a word knowledge test, were divided into four instructional groups of ten each. In each of six sessions two words were presented. Two sessions stressed visual clues, two sessions stressed auditory cues, and two sessions stressed tracing cues. Their results indicated that the first graders with decoding difficulties learned more when visual or auditory cues were stressed than when tracing cues were emphasized. It was observed that the low word knowledge subjects became so involved with the mechanics of tracing that they did not attend to the word as a stimulus. Therefore, Vandever and Neville believe it may be inappropriate to use tracing techniques for first graders with decoding difficulties.

The purpose of a paper by Larry Raskin, Ph.D and Georgia Pitcher Baker, Ph.D. (1975) was to examine studies related to the integration of touch and vision and to present information for teachers of children with learning problems. They found the results of these studies to be surprisingly consistent. Their investigation found vision to be the dominant modality for gathering information for all age groups, populations, and sexes. Considering the conclusion gathered, the authors Raskin and Baker believe an appropriate learning strategy for children of average ability, mildly mentally retarded, or learning disabled would be the following plan: First develop a visual presentation of the material to be learned with visual recognition of the material. If this does not result in learning, the second step would be to add touch to the visual presentation simultaneously. If success is still not achieved, the third step would be a tactual presentation with tactual recognition.

Dunn(1988) researched the importance of teaching through perceptual strengths or preferences. Although there is a lot of conflicting data surrounding this idea learning preferences do exist. However, whether a learning style preference is really a strength has been challenged by certain authors. They suggest that individuals may prefer learning one way more than another, but that choice may not necessarily be the best way for them to grasp and retain information. Dunn found that most early investigations of how young children learned to read neglected to test for kinesthetic and tactual abilities and did not perform experiments that taught using these methods.

Doctoral dissertations by Carbo(1980), Urbschat (1977), Weinberg(1983), and Wheeler (1983) all have data supporting the findings that many children are more tactual and kinesthetic in the primary grades and that their ability to learn visually becomes stronger as they reach the 2nd and 3rd grades.

A study by Ringler and Smith (1973) was conducted to determine the relationships between learning modalities and word recognition of first grade children. The learning modalities being auditory, visual, or kinesthetic/tactile. Their results revealed no significant difference between students who were taught with the method that corresponded to their modality preference and those who were taught with a method that did not correspond to their modality preference.

Educators Samuel Kirk (1933), Dr. Grace Fernald (1943), R.A. Pulliam (1945), Serena Niensted (1968), and Gillingham and Stillmn (1970) all had success using a multisensory approach to assist children with learning disabilities. Of the studies conducted the majority concluded that there was greater word retention when kinesthetic and tactile modalities were added to visual and auditory lessons. Future studies in lower grades should be conducted to determine if implementing tactile strategies would improve retention of sight vocabulary within the classroom, not just in small groups.

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APPENDIX

Subjects	**Number of words retained**						
Control Group	*Word List Number 1*	*Word List Number 2*	*Word List Number 3*	*Word List Number 4*	*Word List Number 5*	*Word List Number 6*	***Final 30 Word Test Upon Completion Of Seven Weeks***
A	2	3	3	2	0	3	24
B	4	3	1	4	***Absent***	3	13
C	5	2	2	2	3	4	26
D	3	4	3	3	3	5	20
E	4	5	2	2	2	1	11
Experimental Group	*Word List Number 1*	*Word List Number 2*	*Word List Number 3*	*Word List Number 4*	*Word List Number 5*	*Word List Number 6*	***Final 30 Word Test Upon Completion Of Seven Weeks***
F	***Absent***	4	***Absent***	5	***Absent***	4	30
G	4	3	***Absent***	4	2	5	25
H	3	***Absent***	4	3	4	5	21
I	2	2	1	2	2	5	15
J	***Absent***	4	***Absent***	4	2	4	23